

**WHAT IS CLAIMED IS:**

1. An optical device comprising:

a WDM port adapted to wavelength division multiplexing (WDM);

first to N-th ports to which first to N-th wavelengths are respectively allocated, where N is an integer greater than 4; and

first to fourth optical filters;

said first optical filter coupling said WDM port to said i-th port by said i-th wavelength, where i is an integer satisfying  $3 \leq i \leq (N - 2)$ , and also coupling said WDM port to said second optical filter by the plural wavelengths except said i-th wavelength;

said second optical filter coupling said first optical filter to said third optical filter by said first to (i - 1)-th wavelengths, and also coupling said first optical filter to said fourth optical filter by said (i + 1)-th to N-th wavelengths;

said third optical filter coupling said second optical filter to said first to (i - 1)-th ports respectively by said first to (i - 1)-th wavelengths;

said fourth optical filter coupling said second optical filter to said (i + 1)-th to N-th ports respectively by said (i + 1)-th to N-th wavelengths.

2. An optical device according to claim 1, wherein said first optical filter comprises a bandpass filter having a passband including said  $i$ -th wavelength.

3. An optical device according to claim 1, wherein said second optical filter comprises any one of a long-wave pass filter and a short-wave pass filter.

4. An optical device according to claim 3, wherein said second optical filter has a cutoff wavelength substantially equal to said  $i$ -th wavelength.

5. An optical device according to claim 1, wherein:

said third optical filter comprises a plurality of bandpass filters respectively connected to said first to  $(i - 1)$ -th ports; and

said fourth optical filter comprises a plurality of bandpass filters respectively connected to said  $(i + 1)$ -th to  $N$ -th ports.

6. An optical device according to claim 1, wherein at least one of said first to fourth optical filters comprises a dielectric multilayer film.

7. An optical device according to claim 1, wherein at least one of said first to fourth optical filters comprises an optical circulator having at least three ports, and a fiber grating connected to one of said at

least three ports.

8. An optical device according to claim 1, further comprising:

(N + 1)-th to (N + j)-th ports to which (N + 1)-th to (N + j)-th wavelengths are respectively allocated, where j is an integer greater than 2; and

fifth to seventh optical filters;

said fifth optical filter coupling said first optical filter to said (N + 1)-th port by said (N + 1)-th wavelength, and also coupling said first optical filter to said second optical filter by the plural wavelengths except said (N + 1)-th wavelength;

said sixth optical filter coupling said second optical filter to said fourth optical filter by said (i + 1)-th to N-th wavelengths, and also coupling said second optical filter to said seventh optical filter by said (N + 2)-th to (N + j)-th wavelengths;

said seventh optical filter coupling said sixth optical filter to said (N + 2)-th to (N + j)-th ports respectively by said (N + 2)-th to (N + j)-th wavelengths.

9. A system comprising:

first and second terminal apparatuses; and

an optical fiber transmission line connecting said first and second terminal apparatuses;

said first terminal apparatus comprising a plurality of optical transmitters for outputting a plurality of optical signals having different wavelengths, and an optical multiplexer for wavelength division multiplexing said plurality of optical signals and outputting resultant WDM signal light to said optical fiber transmission line;

said second terminal apparatus comprising an optical demultiplexer for separating WDM signal light transmitted by said optical fiber transmission line into a plurality of optical signals having different wavelengths, and a plurality of optical receivers for receiving said plurality of optical signals output from said optical demultiplexer;

at least one of said optical multiplexer and said optical demultiplexer comprising an optical device according to any one of claims 1 to 8.

10. A system according to claim 9, further comprising at least one optical amplifier arranged along said optical fiber transmission line.

11. A terminal apparatus comprising a plurality of optical transmitters for outputting a plurality of optical signals having different wavelengths, and an optical multiplexer for wavelength division multiplexing

said plurality of optical signals;

said optical multiplexer comprising an optical device according to any one of claims 1 to 8.

12. A terminal apparatus according to claim 11, further comprising a plurality of variable optical attenuators connected between said plurality of optical transmitters and said optical multiplexer.

13. A terminal apparatus comprising an optical demultiplexer for separating wavelength division multiplexed signal light into a plurality of optical signals having different wavelengths, and a plurality of optical receivers for receiving said plurality of optical signals;

said optical demultiplexer comprising an optical device according to any one of claims 1 to 8.